(Waste management (water, land, air pollution))

Q1.a)(2019)

methane

Q1.b)(2019)

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Q1.c)(2019)

so plants / crops grow faster / better

(decays further and) releases / contains mineral ions / named example

Q2.a)(2020)

fatty acid(s)

Q2.b)(2020)

any **one** from:

- universal indicator (paper / solution)
- pH meter

Q2.c)(2020)

any **two** from:

- volume of milk
- exposure to air / oxygen
- sterilise test tubes
- treatment of milk before investigation
- freshness / age of milk (at start)
- time of day pH was measured

Q2.d)(2020)

almond (milk)

Q2.e)(2020)

as temperature increases up to 15 °C the time taken (to reach pH 5) decreases

above 15 °C the time taken (to reach pH 5) stays the same

Q2.f)(2020)

any **one** from:

- bacteria / microbes / microorganisms / fungi dividing faster (when warmer)
- reactions (in the bacteria) are happening faster (to decay milk)
- (because there is) more (kinetic) energy
- enzyme activity is higher (at 10 °C than at 5 °C)

Q2.g)(2020)

any **two** from:

- different concentration / type of fat / lipid
- different concentration / type of proteins / carbohydrate / sugar
- different (amount / type of) bacteria present
- may have been pasteurised by a different process
- different starting pH

Q2.h)(2020)

determine the types of bacteria present in the milk

Q3.a)(2021)

(put beaker in a) water bath

Q3.b)(2021)

volume of the milk
or
type of milk

Q3.c)(2021)

correct scale and axis labelled

all points plotted correctly

suitable curved line of best fit

Q3.d)(2021)

similar shaped line drawn to left of 20 °C line on **Figure 4**

same start pH

Q4.a)(2022)

bacteria

Q4.b)(2022)

any **two** from:

- bacteria increase **before** protozoa increase
  or
  when bacteria are high, protozoa increase
- as protozoa increase, bacteria decrease
- (after site **A**) as bacteria decrease, protozoa also decrease

Q4.c)(2022)

(aerobic) respiration

Q4.d)(2022)

(algae carry out) photosynthesis

(which) produces oxygen

Q4.e)(2022)

bars plotted correctly

suitable shading

Q4.f)(2022)

more sludge worms at **A** (than at **B)**

no mayfly nymphs at **A and** mayfly nymphs present at **B**

Q5.a)(2023)

the pH of the milk

Q5.b)(2023)

put the beaker in a water bath

Q5.c)(2023)

fatty acid

Q5.d)(2023)

all the fat had been digested

Q5.e)(2023)

any **one** from:

- (there is) more (kinetic) energy

- enzyme activity is higher

- bacteria / microorganisms are dividing / reproducing faster

Q5.f)(2023)

(30 °C, 2 days) 6(.0)
and
(30 °C, 3 days) 4.7

(fall) 1.3 (pH units/day)

Q5.g)(2023)

$$\frac{1.3}{0.1}$$

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